DOCUMENT RESUME

ED 215 143 CE 031 900

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TITLE Communication Linkage Implementation Study. Final Report.
INSTITUTION Ohio State Univ., Columbus. National Center for Research in Vocational Education.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE Jan 82
CONTRACT 300-78-0032
NOTE 21p.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Agency Cooperation; Databases; *Facsimile Transmission; Higher Education; *Information Dissemination; *Information Networks; Information Services; Information Systems; *Online Systems; *Program Implementation; Program Improvement; Research Utilization; *Vocational Education
IDENTIFIERS *Message Switching

ABSTRACT

This directed study, part of the applied research and development effort of the National Center for Research in Vocational Education, focused on the use of emerging telecommunications technology to facilitate communication among vocational education program improvement agencies. The study attempted to introduce and implement new developments in computer-based message systems to take advantage of cost savings and time management. A system was identified using message switching with a central computer to provide a link between terminals. It was noted that the introduction of new technology and new patterns of communicating, although demonstrated to be more cost effective, is not easy. It involves re-education of the format, equipment, and habits developed over the years. The findings of this study illustrate the need to incorporate new technology to decrease the response time in answering requests, share available information across state and regional boundaries, and disseminate information in a more cost-effective manner. Tight budget conditions in vocational agencies impaired the quick adoption of message switching, but at the end of the first year, the quorum of six had joined with an additional six agencies expressing strong interest. If additional funding is approved, it is anticipated that message switching will be used to provide faster access to the program improvement database, plan conference agendas, support an electronic mailbox, and provide for the successful application and implementation of new and improved practices for vocational education program improvement agencies. (KC)

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ED215143

COMMUNICATION LINKAGE IMPLEMENTATION STUDY

Final Report

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NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

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January 1982

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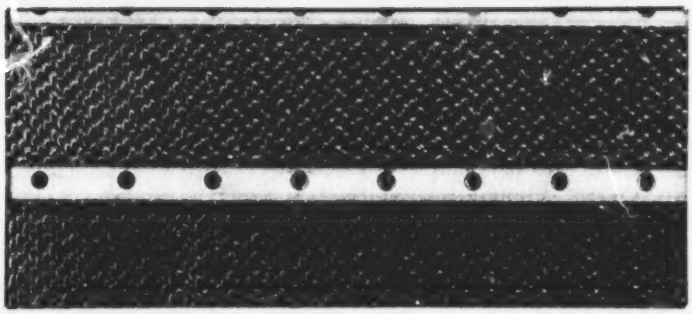

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- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Providing information for national planning and policy
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

FUNDING INFORMATION

Project Title:	Communication Linkage Implementation Study
Study Contract Number:	300780032
Project Number:	051MH10012
Educational Act under Which the Funds were Administered:	Education Amendments of 1976, PL 94-482
Source of Contract:	U.S. Department of Education Office of Vocational and Adult Education Washington, D.C.
Contractor:	The National Center for Research in Vocational Education The Ohio State University Columbus, Ohio 43210
Executive Director:	Robert E. Taylor
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FOREWORD

The application of research and development in vocational education is one of the missions of the National Center for Research in Vocational Education, particularly in the area of information systems. The establishment of a computer-assisted message system has been an opportunity to incorporate present National Center information processing technology with new developments in this rapidly developing area. This involves related vocational education program improvement agencies in the advancement and completion of our mutual goals.

We appreciate the cooperation of the Curriculum Coordination Centers, state departments of vocational education, and RCU directors in working with us during this past year.

Recognition is given to the Information Systems Division staff for their efforts in the conduct of this study: Carl F. Oldsen, Project Director; Wesley Budke, Senior Research Specialist; Ruth Gordon, Program Associate; and Lyn Deal, secretary.

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

This directed study, part of the applied research and development effort of the National Center, focuses on the use of emerging telecommunications technology to facilitate communication among vocational education program improvement agencies. Traditional means of letters, telephone, and personal meetings, whereas effective to a degree, have drawbacks in terms of cost and time. This study has attempted to introduce and implement new developments in computer-based message systems to take advantage of cost savings and time management on economies of scale heretofore unavailable. Included is a discussion of telefacsimile, message switching using a central computer to provide a link between terminals, and yet to be considered applications of communications satellites, laser devices, and fiber optics.

The introduction of new technology and new patterns of communicating, although demonstrated to be more cost effective, is not easy. It involves re-education to the format, equipment, and habits developed over the years. The findings of this study illustrate the need to incorporate new technology to decrease the response time in answering requests, share available information across state and regional boundaries, and disseminate information in a more cost-effective manner.

Tight budget conditions in vocational agencies impaired the quick adoption of message switching, but at the end of the first year, the quorum of six had joined with an additional six agencies expressing strong interest. If additional funding is approved, it is anticipated that message switching will be used to provide faster access to the program improvement database, plan conference agendas, support an electronic mailbox and provide for the successful application and implementation of new and improved practices for vocational education program improvements agencies.

COMMUNICATION LINKAGE

Introduction

The National Center for Research in Vocational Education was asked by the Office of Vocational and Adult Education (OVAE) U.S. Department of Education to conduct a study in applied research and development as part of the Year IV scope of work. The focus of this particular study was on the use of new and emerging telecommunications technology and message switching capabilities for vocational education. This final report outlines the results of that study and reports findings and recommendations for continued and future implementation.

Background

The exchange of information among vocational education agencies routinely has been handled by telephone, letter, and personal meetings on a scheduled basis. These traditional means have been responsive to needs, but with the advent of recent advances in telecommunications technology it has become apparent that information exchange could be accomplished in a faster and more cost-effective manner. Factors accounting for this have been the increase in computer storage capacity, annual reductions in the cost to store information in machine readable form, and the increasing availability and access to computer terminals. Coupled with this is the desire and need to respond to information requests in a more prompt manner, the sharing of information across state and regional boundaries in order to maximize usage, and to lessen

the need to replicate work done elsewhere now that its existence has been made possible by these advances.

These developments point towards future applications that will increase the sharing of resources, reduce duplication of efforts, and diffuse knowledge about developments in other states, regions, and even countries. The purpose of this study is to investigate where vocational education can benefit from these advances and incorporate them into their daily operations.

A continuing reading and review of the literature in this area along with recent innovations incorporated by the National Center in its National Center Clearinghouse has kept us abreast of new and promising developments. These have been as follows:

- o Telefacsimile: the transmission and receipt of graphic and written information over long distance by telephone lines.
- o Telecommunications message switching: this capability results from the merger of the computer and telecommunications into computer-based message systems (CBMS). Users employ a standard terminal keyboard that is connected over telephone lines into a central computer. This computer is programmed to accept and route messages, to prompt and help users prepare messages, and provide "news services" or "electronic mailboxes."
- o Others have included: communications satellites, laser devices, and fiber optics, but are considered beyond our scope of application at this time.

Experience had been gained in telefacsimile transmission with the federal sponsor, state departments of vocational education, and information and curriculum centers, and we were familiar with its advantages and disadvantages. Similarly, the decision to put the Resources in Vocational Education (RIVE),

or program improvement file, in a machine readable format provided the adjunct opportunity to use the message switching introduced by the vendor building the database. One of the activities in developing the database were the frequent requests to state education departments for proposal abstracts of projects. This was done by letter of solicitation and telephone contacts on a frequent basis. Realizing the costs involved and the availability of the message switching service, it seemed a natural blending of an existing need and an available service.

With this in mind, identification was made of available services offering message switching capability and the particular services they offered. These included the following:

- o Bibliographic Retrieval Service (BRS), and its affiliate Education Service Group (ESG)
- o Electronic Information Exchange System (EIES) of the New Jersey Institute of Technology
- o Informedia, its Planet and Notepad systems
- o U.S. Postal Service's Electronic Computer-Generated Mail (ECOM)

The incorporation of these technologies for the purpose of the study is a way to (a) establish a sense of community for users; (b) enhance the productivity of users as a group; and (c) to aid and assist in solving problems of common concern through the rapid and economical exchange of information.

The potential applications for the vocational education community included: (a) the tracking and receipt of state and federally administered research projects and products resulting from them, (b) use of intercenter (library) loan services to exchange information about materials not in local

centers, (c) responding to information requests between centers, and (4) dissemination of information via electronic newsletter or mailbox routes.

Given these potential uses, the services of the potential vendors were examined in terms of the following:

- o Availability of an operating system
- o Ease of use
- o Familiarity with educational agencies
- o Cost

BRS was selected as offering the highest potential as the service provider by having (a) an operational system in place, (b) an instruction guide of less than two pages, (c) experience in working with education agencies, and specifically with vocational education, and (d) most significant, its low cost in comparison to the others. BRS through ESG required no monthly fee or minimum charge, an advance payment was not required, its low cost of 40 cents per on-line minute, and the opportunity to search the RIVE database without having to switch vendors. None of the other vendors were able to offer a competitive rate, nor had experience with educational agencies and were focused more to commercial users.

Methodology

The procedures to carry out the objectives of the study have evolved through a series of meetings, telephone contacts, and correspondence with vocational agencies in responding to related National Center scopes of work. There has been a need to establish a routine, easy to use, and cost-effective communications system that would incorporate innovative technology. Several centers and state departments had expressed interest in developing and/or participating in such a network, and interviews with National Center project

staff provided a nucleus of potential users. This listing was examined to ensure a geographical balance, large to small populated states, and inclusion of the six curriculum centers of the National Network for Curriculum Coordination in Vocational Technical Education (NNCCVTE). See Appendix 1 for a list of these eighteen agencies.

An announcement letter was sent to the eighteen agencies, see Appendix 2, citing the objectives of the study and to solicit their opinion and desire to participate. Furthermore, each agency was asked to determine the availability of access to a computer terminal, and the particular model number from an enclosed list.

Responses received from these agencies were arranged on a matrix to indicate date of response, contact person, terminal availability, and if so, specific model number, and any comments or additional questions that required clarification. Two agencies responded that participation was not possible, South Carolina RCU had no funding, and Tennessee RCU had no RCU director. Over a three month period, collection of data revealed that the paramount issue was the cost to use the system, that considerable confusion existed as to what was involved in using the system, and lack of clear access to a computer terminal in their respective departments. The latter pointed up a need for much improved articulation among agencies in the availability and use of equipment. Not only was there confusion on availability, but many phone responses and discussions revealed a severe lack of what was and would be involved in the use of such a system. Demand for such a system was there, but remarks as "it would cost too much," "no computer" (where actually only a terminal is required), "concern over receiving too much electronic junk mail,"

"working on it," and "concern over proposing a new expenditure in tight money times," were characteristic of these conversations.

These concerns measured against the service availabilities of potential vendors established BRS's Education Service Group (ESG) as the most promising service promoter. Of foremost importance was the no initial cost feature of BRS, and coupled with the lowest operating cost, it clearly was the best vendor to provide the service. Its past and present experience with educational agencies was also voted a plus, whereas the others were not nearly as strong in this area and were primarily used by commercial firms.

Study participants were notified of the vendor selection by the National Center and they also received a concurrent mailing from ESG containing information on sign-up procedure and suggesting an initial payment of $250. The $250 was intended to be an account, which usage could be charged against, $23/hour, prorated to 40 cents a minute, but was later dropped when ESG said it was not necessary. Participants were asked to indicate their desire to join by returning the School Practices Information Network (SPIN) application form (see Appendix 3) and member profile to BRS, which in turn would assign a terminal password to the agency, notify the National Center of membership, and the National Center would then provide the instruction sheet on accessing the message switching system. Membership in SPIN was essential as it allowed ESG to provide the low education rate for file access, the lowest per hour rate available from any vendor.

The selling of message switching proved to be a continuous and needed task given the lack of computer and information science knowledge among the agencies. Presentations were given at the National Research Coordinator's Unit Directors meeting in San Antonio, and the NNCCTVE Conference in Atlanta,

Georgia on message switching, equipment required, how-to-use-it, sample messages, and demonstrations of actual usage. It also provided an opportunity for discussion with agency personnel, which reflected high interest and need, but reluctance to join because of: (a) general budget reductions in their agencies; (b) resistance to a new technology; (c) lack of momentum required to initiate the paperwork up through their departments and bureaucracy. Responses to these concerns were reflected in our information handouts, which noted that message switching is actually cheaper than a letter or telephone call--$2.00 for a message, over $8.50 and $5.00 respectively for alternative forms. In addition, the terminal was available in most agencies, either in their department, or "across the hall," and would provide for cooperative and economical sharing of the device, and sample letters were provided to initiate the service request through their respective channels.

The first agencies to indicate participation were the California RCU, East Central CCC, Northeast CCC, OVAE, and the Massachusetts Vocational Curriculum Development Center, but still lacking the necessary quorum (6) to initiate service. At this time, the following agencies are working towards becoming members: Florida RCU, Arizona RCU, West Virginia RCU, and the Western CCC. Their participation will allow for formal service to start. Reasons for nonparticipation by others to date include, (1) attempting to interface a word processing terminal to use as the communications link, (2) working on terminal availability, and (3) needed but "working on it." Expressions of interest have been received from: Washington RCU, Northwest CCC, Midwest CCC, Nevada RCU, and North Dakota RCU.

Findings

The absence of a full-fledged message-switching network as an outcome during the study's first year was not totally unexpected. Nevertheless, the lack of use of the features available from the selected vendor that were directly responsive to the agency's expressed needs is disappointing. It is apparent that much education needs to be done to inform and clarify what a computer and its peripheral equipment can and cannot do.

It is also clear that cost savings illustrated in the use of new technology does not ensure its swift adoption and implementation. The momentum required to initiate change in an agency is tremendous and particularly so in times of tight budgets. Presentations and demonstrations of message switchings have uncovered other potential users beyond the original eighteen, and through participation with ESG, efforts will be made to enlist their participation.

Recommendations

(1) Use the base of agencies currently enrolled to expand to a full-fledged network during the second year if continued sponsor is obtained. (2) Capitalize on extant start-up efforts to solicit members, educate all agencies in the use and versatility of computers and adjunct equipment, and assist in providing technical assistance as required to bring about participation and use. Several strategies should be employed to address these concerns, including the following:

A. Provide faster access to the program improvement file

B. Decrease acquisition time for receipt of proposal and product abstracts for the file

C. Use message switching to plan conference agendas and distribute information on follow-up activities

D. Introduce an on-line newsletter to provide timely and concise information among the National Center, the CCCs, the RCUs, and OVAE.

E. Demonstrate use of message switching at the National RCU and NNCCVTE Conferences.

F. Place emphasis on increased use of the system to reduce the costs associated with traditional mail and telephone communications, and personal meetings.

These efforts should bring about increased usage, broader participation, and provide for the application of computer technology within vocational education program improvement agencies.

APPENDICES

APPENDIX 1

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THE NATIONAL CENTER
FOR RESEARCH IN VOCATIONAL EDUCATION

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March 3, 1981

Carroll A. Curtis, Director
Research Coordinating Unit
State Department of Education
333 Market Street
Harrisburg, Pennsylvania 17126

Dear Carroll:

We have been asked by the Office of Vocational and Adult Education (OVAE) to conduct a feasibility study of a telecommunications message-switching network during the next 12 months. Your being a part of a key organization in this network, we would like to solicit your opinion and participation in this study.

The purpose of this proposed network would be to provide for the rapid and economical exchange of information between available computer terminals.

Our objectives are:

- To identify and describe the communication and information access needs of key organizations and agencies in the vocational education community.
- To identify and describe the communication technology and computer linkage options available to provide needed service.
- To select one or more communication or computer linkages and pilot test with a limited number of organizations and agencies.
- To prepare recommendations for further study or implementation.

To participate, it is essential that you have convenient access to a computer terminal. Would you please examine the attached listing of commonly available terminals to see if you have one of those listed? I would appreciate hearing from you by letter or via our toll-free number (800) 848-4815 regarding this capability and to provide additional information.

Sincerely,

Carl

Carl Oldsen
Research Specialist
National Center Clearinghouse

CFO:bdb

Attachment

SCHOOL PRACTICES INFORMATION NETWORK

AGREEMENT FORM

APPENDIX 3

The _____
(name of agency)

_____

located at _____
(agency address)

_____

is pleased to participate in the School Practices Information Network (SPIN).

As a participant, we will be willing to accept and send electronic mail requests that are pertinent to our area of interest. We will respond to those requests on a timely basis and in keeping with the information provided on the SPIN Member Profile sheet.

As an active SPIN member, we understand that the full benefits outlined in the SPIN announcement material (sent to us with this Agreement Form) are applicable to us.

Please add our Member Profile to the Member Directory for distribution to both present and future members. We further agree that the information on our profile may be made searchable online, along with other member profiles, so as to speed the identification of SPIN members that might be of assistance.

We have also enclosed the completed Online Services Form (only necessary for new members who are not currently online with BRS).

_____ _____
Name Date

_____
Title